Bandolier
What do we think? What do we know? What can we prove?
9
Evidence-based health care
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STOPPING SMOKING

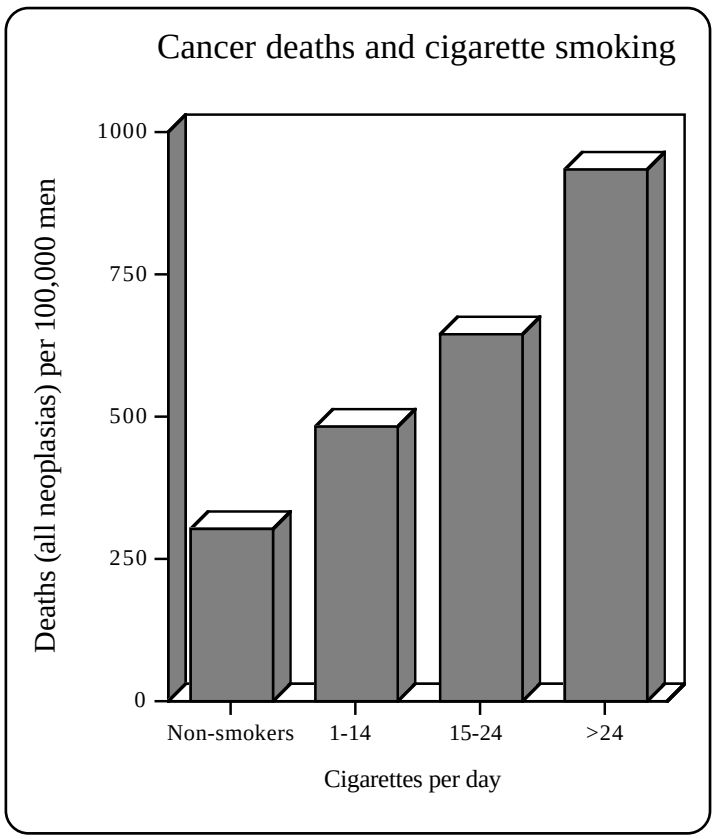
Just recently there have been a number of superb articles on smoking from both sides of the Atlantic - the 'Human cost of tobacco' series in the New England Journal [1,2], and Doll, Peto and colleagues reporting of the 40-year follow up on British doctors [3], and associated commentaries [4,5]. ***Bandolier*** wanted to know the most effective way to stop current smokers from smoking, and this focus article centres on that issue.

The human cost of a cigarette

The human costs of using tobacco use are charted in admirable starkness by Robert Schrier and his colleagues from Colorado, prompted because the prevalence of smoking in the US has plateaued at 26% after two decades of decline. Their two reviews, containing 114 references mainly to the US literature, chart the health and economic costs.

Most people, especially health professionals, think they know the risks associated with tobacco smoking. Reading the first of these articles [1] and the report on mortality of British doctors [3], is likely to make all except the most expert think again.

These reports are not 'mindstretchers', but mindblowers. The way in which tobacco use constitutes the single largest threat to the health of the nation has been consistently understated - the more studies are performed, the greater are the number of diseases where tobacco use makes an impact.



If cigarettes cost more, then fewer people will smoke them, especially women and members of the lowest socio-economic groups where smoking prevalence is still as high as 50% [6]. Reduce prices, as happened in the UK between 1977 and 1979, and smoking goes up; increase prices, as has generally been the case since the early '80s, and smoking falls. The commitment of government to steadily increase the tax on cigarettes year-by-year should have an impact.

The economic cost of a cigarette

In the US it has been estimated that the average lifetime medical costs for a smoker are $6,000 greater than those for a non-smoker. The Congressional Office of Technology Assessment has estimated that the total financial cost of smoking to society in 1990 was $2.59 per pack of cigarettes (about £1.70 per packet at current exchange rates). There are numerous ways in which the economic costs of smoking and smoking-related diseases can be calculated, but whichever way it is calculated, all the numbers are big.

Other big numbers are seen in tobacco company profits - Philip Morris made more money in 1992 than any other US industrial corporation - $4,900,000,000. (Ironically some tobacco companies have diversified into insurance, which have higher charges for smokers than non-smokers.) Another large number is that of tobacco company spending on advertising - $2,000,000,000 a year by Philip Morris alone.

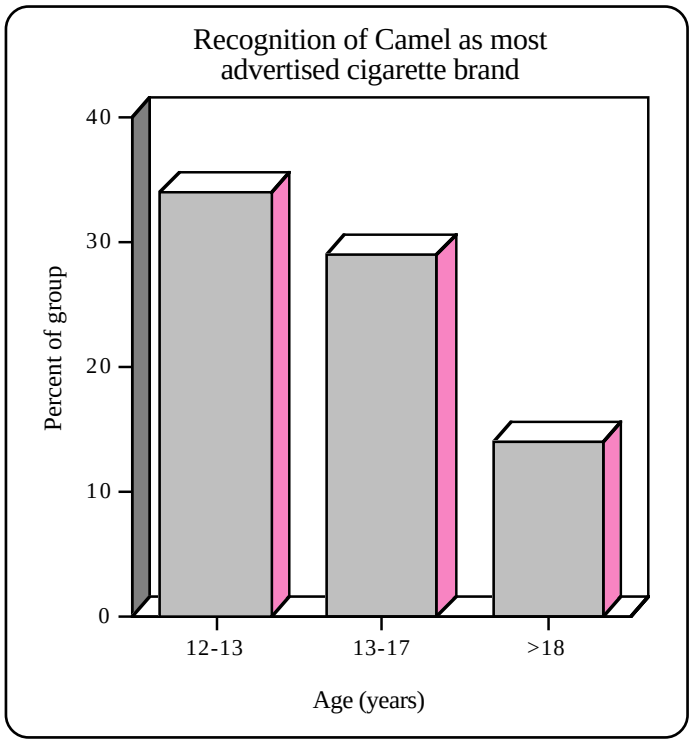
Tobacco advertising isn't Mickey Mouse!

When TV advertising of cigarettes was stopped in the US, the advertising revenue of magazines went up by an average of $5.5 million a year, and smoking actually increased.

Buying sponsorship for sport is also very effective. During the 1989 broadcast of the Marlboro Grand Prix, lasting 93 minutes, the Marlboro name was mentioned 11 times and the logo shown a staggering 5,922 times, for a total of 46 minutes of exposure of which 18 minutes was "clear, in-focus air time".

The most chilling evidence of effectiveness of tobacco advertising relates to children recognising tobacco symbols. An RJR Nabisco campaign in 1988 featured a character, possibly modelled on James Bond, called Old Joe Camel. Three years into the campaign, Camel was recognised much more by children than adults as the most frequently adver-

tised brand. Over 30% of 3-year olds and over 80% of 6-year olds were able to associate a picture of Old Joe Camel with a packet of cigarettes - for 6-year olds about the same number who were able to associate the Disney logo with Mickey Mouse!



Campaigns to prevent tobacco use

The second of the NEJM articles [2] has a plethora of interesting facts on economics, advertising and issues relating to preventing tobacco use. Though these are directed at the US, most issues relating to reducing tobacco use are relevant, including:-

- increased taxation.
- comprehensive smoking bans.
- advertising and sponsorship bans.
- restricting sales to children.
- financial support for counter-advertising.
- community education programmes.

How to help the smoker

All of these issues are important parts of strategies to prevent smoking in populations. What about the individual smoker - what can be offered by healthcare professionals to help in giving up smoking, and what is effective?

Nicotine replacement therapy (NRT)

Nicotine replacement therapy is based on the idea that replacing nicotine in the body allows smoking behaviour to be stopped. A gradual weaning of the subject from nicotine follows without the pharmacological sequelae.

There have been three meta-analyses of nicotine replacement therapy published this year, looking mainly at nicotine chewing gum and nicotine patches [7-9]. Though slightly different in the range of studies included and methods used, they all had the same conclusion - that NRT is significant in helping smokers stop smoking.

Tang et al [7] analysed 28 randomised trials of 2 mg nicotine gum, six trials of 4 mg nicotine gum and six trials of transdermal patch. They used as a main outcome measure the difference between percent of control and NRT-treated patients who had stopped smoking at one year. The results showed that 2 mg nicotine chewing gum helped an extra 6% of smokers quit over controls, but this was as high as 11% in self-referred subjects and as low as 3% in invited subjects, suggesting that the desire to quit was essential.

When examined by dependency and whether patients were self referred or invited, the results showed that nicotine gum was helpful in highly dependent subjects.

Effects of NRT by degree of nicotine dependence

High Dependency

	No (%) who quit	
Group	**Gum**	**Control**
Self referred	51/90	53/155
	(57)	(34)
Invited	53/210	33/180
	(25)	(18)

Low Dependency

	No (%) who quit	
Group	**Gum**	**Control**
Self referred	32/61	20/38
	(52)	(53)
Invited	65/258	51/229
	(25)	(22)

The meta-analysis by Silagy et al [8] examined 53 trials, 42 with gum, nine with patch, one with intranasal spray and one with inhaler. The results were generally similar, though expressed differently. The odds ratios for abstinence were increased with use of NRT, but differently for different forms. This report also looked at the numbers needed to be treated (NNT) to obtain one extra non-smoker at 12 months beyond the number who would achieve that with the control intervention: results are shown on the top of page 3.

The nicotine patch was the particular focus of the third meta-analysis [9]. Here 17 studies were identified, with nearly 5100 subjects. At six months 22% treated with patch had stopped smoking compared with 9% for placebo. The patch type (24 vs. 16 hours), patch treatment duration (more or less than 8 weeks), weaning, nor counselling format or intensity made no difference to result. There was some evidence that intensive behavioural counselling had a modest effect on increasing rates of smoking cessation.

Unaided smoking cessation

What about all the smokers who give up on their own, without medical help; how do they do it? Lennox and Taylor [10] used postal questionnaires in Aberdeen to investigate this. The simple finding was that light and heavy smokers found it easier to give up than did moderate smokers.

NRT preparations and abstinence				
NRT preparation (No. of trials)	% Quitting		OR (95%CI)	NNT
	Active	Control		
Gum (39)	18.2	10.6	1.6 (1.5-1.8)	13
Patches (9)	20.5	10.8	2.1 (1.6-2.6)	10
Nasal spray (1)	25.9	9.9	2.9 (1.5-5.7)	6
Inhaler (1)	15.2	5.0	3.0 (1.4-6.6)	10

Those who succeeded thought they had social support, and were more likely to have 'simply just stopped'. They were less likely to have used nicotine gum or believe that smoking was harmful. Failures experienced more withdrawal symptoms and were likely to be tempted by others smoking. Eleven percent had never tried to stop; these were older, but were more likely to stop for financial reasons.

What about other methods?

To find methods of smoking cessation which have used objective markers of smoking cessation, ***Bandolier*** performed a MEDLINE search from 1989-1994 using the words cotinine and urine. Cotinine is a metabolite of nicotine, and measurement of cotinine and hydroxyl metabolites of cotinine in urine (or blood or other body fluids) can be a useful objective test of nicotine intake. Obviously the use of gum or patch invalidates the test. While vegetables and other foods contain nicotine, huge amounts would need to be eaten to invalidate a cotinine test for active smoking, though that may not be so for passive smoking [11].

Measurement of urinary cotinine is likely to be helpful in determining the smoking behaviour in smoking cessation. Thus in a Japanese study of 49 patients who claimed to have stopped smoking, urinary cotinine concentrations one month after intensive instructions to stop smoking in a series of cardiac patients [12], only 30 had actually stopped smoking. There was a clear decrease of urinary cotinine in the quitters compared with no change in those who had not stopped.

Behaviour therapy

A German report [13] of an RCT of structured extensive behaviour therapy compared with a single unstructured antismoking advice session given by a physician in diabetic patients was disappointingly negative. Of 794 insulin-treated patients, only 89 consented to enter the study in which smoking cessation was measured objectively by urinary cotinine.

After six months, 2/44 patients randomised to the intensive behaviour therapy had stopped, compared with 7/45 who received the unstructured intervention.

Getting to mothers of infants

An attempt to use infants' cotinine levels was completely without effect [14] as a warning to mothers to reduce or stop smoking in a RCT where the physician telephoned the mother to report the urinary cotinine result and explain its meaning .

Smoking cessation in pregnancy

Because maternal smoking is associated with increased foetal risk and low birthweight, trying to prevent pregnant women smoking has top priority. One RCT [15] compared an immediate 20-minute intervention by a practice nurse with an evening class providing guidance on a self-help program for two hours on a group basis. Smoking cessation was confirmed by urinary cotinine measurement.

None of the women randomised to the intensive evening class attended, compared with 93% assigned to the immediate intervention. Rates of smoking cessation immediately after intervention, at 36 weeks gestation and postpartum were about 6% for the former and 14% for the latter.

However, there is one study which shows some success. Again, this was an RCT begun in early pregnancy, with randomisation between standard obstetric care and an intervention with self-help materials on smoking cessation in addition [16].

Self reported smoking behaviour was confirmed with a urinary cotinine test. This showed that 25% of women who said they were not smoking actually did smoke. The smoking cessation rates were not significantly different during pregnancy at about 24%, but at 8 weeks postpartum 29% of smokers had given up in the intervention group compared with under 10% in the non-intervention group. The cost of the intervention (self-help manual and audio-tapes) was $50-111 per patient.

Conclusion

Nicotine addiction through cigarette smoking is recognised as the largest single cause of poor health in the UK. Nicotine replacement therapy has clearly been demonstrated to help people give up smoking, and directed government policies on issues like tax are also of great value in deterring smokers.

Strategies for smoking cessation seem not to be well developed, and though NRT is unequivocally helpful, this seems to be true to a limited extent in certain smokers. It is disappointing that more effective smoking cessation strategies have not been developed in the face of the enormity of the problem.

Bandolier recognises that effective smoking cessation strategies may have been missed by its limited search. Readers who are aware of strategies of proven success are invited to send details for publication in a future issue.

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SHARED CARE FOR DIABETES - A SYSTEMATIC REVIEW

Medical writer Dr Trisha Greenhalgh was recently commissioned by North Thames RHA to prepare a comprehensive review of shared care systems for diabetes. The research, which has just been published as a book by the Royal College of General Practitioners [1], was performed according to standard methodology for systematic reviews produced by the UK Cochrane Centre in Oxford.

Methods

An extensive search of manual and electronic databases and personal communication with workers in the field revealed five RCTs, two comparative and three longitudinal, as well as 12 published descriptive studies and around 30 unpublished schemes in the UK. In her report Dr Greenhalgh highlights the main conclusions from the published trials, suggests areas for further research and makes some general recommendations for the implementation of new shared care initiatives.

Main findings

1: Both the randomised and non-randomised trials demonstrated clearly that structured care by GPs with an interest in diabetes and supported by an enthusiastic specialist liaison team produces comparable, and occasionally superior, levels of care to those provided in hospital. Unstructured care by disinterested and unsupported GPs is ineffective and wasteful of resources.

Structured care comprises systematic recall of patients, allocation of protected time, and adherence to a standard management protocol.

2: The three RCTs whose findings supported shared care had two common features: a centralised prompting system that recalled patients for appointments, and some form of structured checklist for the GP.

3: Established shared care schemes fell into two broad categories: firstly centralised, hospital-based and consultant-led, and secondly decentralised, community based and multidisciplinary. In all published successful schemes an enthusiastic key individual or close-knit steering group was clearly identifiable: the team was usually, but not always, led by a consultant diabetologist.

4: Three common features of successful district-wide shared care schemes were:

- an extensive planning phase in which objectives were carefully defined and the facilities, expertise and commitment of individual general practices were assessed.
- locally-developed written guidelines for diabetic management.
- a well-developed outreach service, with a highly trained nurse-facilitator who could advise on practical problems, maintain enthusiasm and enable 'fast tracking' of patients for specialist review.

5: Maintaining standards was found to depend on regular audit, as has been shown before with chronic disease management programmes in general practice.

Recommendations

Like all good reviews, the work is not only useful as a description of what is known ***now***, but is also a springboard for recommendations and new research to improve effectiveness in the ***future***. The chief recommendations in Dr Greenhalgh's report are:-

i) The central tenets of any shared care scheme are the "three Rs" of chronic disease management - registration, recall and regular review.

ii) Setting up a shared care scheme is essentially an exercise in change management: success depends on ownership by the participants. GPs should be involved in standard-setting and strategic planning at the outset.

iii) Extensive preliminary research is essential. Heterogeneity of needs and resources in general practice requires diversity of solutions.

iv) Care should be shared rather than shifted. An efficient and effective outreach service will bring out the best in each primary care team.

v) An audit cycle with clear, relevant and measurable objectives should be included in the scheme from the outset. Locally developed, district-wide audit guidelines will enable individual performance to be measured against common standards.

Future research

Possible areas for future research include:-

- longer-term follow-up of patients in trials already published or underway.
- exploration of the educational needs of the primary health care team and ways of meeting those needs.
- development of a simple audit dataset for use at the primary-secondary care interface.
- analysis of the practical problems associated with information transfer on large, centralised electronic databases.
- exploration of ways to involve less innovative practices in shared care systems.
- comparison of cost-effectiveness of different shared care systems.

An excellent and readable report with solid and workable advice.

Peter Richardson
R&D Manager, North Thames RHA

Reference:

1 PM Greenhalgh. Shared care for diabetes: a systematic review. RCGP Occasional Paper 67. London, Royal College of General Practitioners, October 1994.

CARDIAC REHABILITATION

Heart disease causes distress and impairs quality of life. Cardiac rehabilitation is a multidisciplinary approach to improve short-term recovery and promote long-term changes in lifestyle which help to correct adverse risk factors. It is a process by which patients are restored to and maintained in optimal physical, emotional, social, vocational and economic state.

Cardiac rehabilitation services usually include exercise training, risk factor modification, education and counselling. The principal justification for rehabilitation is the encouragement of return to full activities and a reduction in well-documented convalescence problems of lack of confidence and sleep, anxiety, depression fatigue and worry about non-specific physical symptoms together with excessive caution about everyday activities [1].

Where are we now?

The prevalence of ischaemic heart disease varies considerably, but for a district with a population of 250,000 between 25 and 750 patients a year will be suitable for cardiac rehabilitation.

Although efficacy and importance of cardiac rehabilitation is well recognised, the nature of existing hospital or community-based services in the UK varies considerably. Fewer than half of health districts have established programmes. Few of the programmes which do exist have been subject to careful audit, and there is little information on issues such as the type of service offered, characteristics of patients who use the service, the training and training needs of healthcare professionals involved, resources and outcome measures used.

Benefits of exercise?

Pooled data from several studies has indicated that exercise-based cardiac rehabilitation results in a reduction in overall and cardiovascular mortality of around 25% [2,3]; the first of these references analysed combined results of 10 RCTs involving 4347 patients, and the second overviewed 22 RCTs.

Benefits of risk factor intervention?

Studies of risk factor intervention and psychological support have produced less dramatic but still impressive effects, not only for patients themselves, but also for their partners [4-6].

Benefits of psychosocial interventions?

There are no published reports of RCTs with convincing evidence for the benefits of psychosocial interventions.

Problems faced now?

There is a need for objective assessments of the physical, psycho-social and economic benefits of cardiac rehabilitation programmes. Programmes need to be developed which are evidence-based and which have on-going evaluation of a number of components of a comprehensive system, including graded exercise, education and support, and secondary prevention measures. The way in which service can be delivered effectively to special groups, like the elderly, women and ethnic minorities warrants special attention.

There are no accepted procedures for the assessment of quality of life during cardiac rehabilitation. What is required are standardised acceptable measures for use in individual patient care, audit of programmes, evaluation of interventions and examination of cost effectiveness.

Conclusion

The availability of cardiac rehabilitation programmes seems justified because it is cost effective [7], the financial benefits gained in terms of productivity and maintaining an occupational income by return to work are clear, and rehabilitation may results in lower costs of further hospital admissions [8]. Mechanisms for delivering a cost-effective service need greater definition.

Dr David R Thompson
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References:

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2 GT O'Connor, JE Buring, S Yusuf et al. An overview of randomised controlled trials of rehabilitation with exercise after myocardial infarction. Circulation 1989 80: 234-44.

Checklist for Cardiac Rehabilitation

A cardiac rehabilitation programme should have most or all of the following, though the structure will depend upon available resources including people, equipment, patients and organisation and coordination of sessions.

People

An experienced coronary care nurse is ideal for taking responsibility for coordinating the programme. Services of a physiotherapist, dietician, clinical psychologist, pharmacist, vocational counsellor and social worker may be included to varying extents where appropriate.

Equipment

Resuscitation equipment including a defibrillator must be at hand and exercise equipment should be checked regularly and correctly maintained.

Patients

Inexpensive early routine care (exercise, advice, self-help materials) should be available for all patients. Monitoring during convalescence is necessary to identify those requiring extra continuing help for cardiac, social or psychological problems, whether or not they have attended a routine programme.

Organisation & Coordination

Close coordination between cardiac aftercare and rehabilitation services is important. A local full-time coordinator is essential to ensure that patients are identified, to liaise with other professionals and to monitor and audit activity in relation to agreed guidelines.

Content

The cardiac rehabilitation programme should offer a range of components, including a flexible menu of methods, and emphasise individual prescription of care. A programme usually includes exercise training, relaxation, risk factor modification, education and counselling. Programmes should begin from the cardiac event itself and should place emphasis on the patients resuming control of their recovery and future lifestyle.

Evaluation and audit

Each programme should keep a record of the numbers attending (including partners) and the drop out rate and reasons for non-attendance.

Outcome measures should include risk factor reduction outcomes (smoking, physical activity, blood pressure, weight, cholesterol), physical outcomes (mortality, reinfarction, cardiac arrest, ventricular function, myocardial ischaemia, physical working capacity, symptom limitations, task and activity performance), psychosocial outcomes (return to work, quality of life) as well as other outcomes (adverse events, non compliance, readmission).

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Being in control

For many years the UK National External Quality Assurance Service (UKNEQAS) has been developing world-leading methods of ensuring that pathology results obtained in Cornwall are the same as those found in the Highlands of Scotland. Behind UKNEQAS is a raft or organisation which includes professional bodies and which ensures that any (rare) case of inadequate performance is put right. Professional organisations have followed the lead of UKNEQAS and have published detailed methodological reviews to aid the working scientist and pathologist.

UKNEQAS, though, is much more than proficiency testing; the organisers of the various schemes are skilled and knowledgeable people who spend much time and effort in helping laboratories which may have problems, in devising suitable ways of testing methods as well as laboratories for adequate performance, and in helping commercial suppliers to make products available which are scientifically sound.

Testing is not now confined to the laboratory. There are many circumstances in which testing is extra-laboratory, from ITUs and CCUs in hospitals, to testing for allergy and allergens, C-Reactive Protein (equivalent of ESR), or Helicobacter pylori in the doctor's surgery. While there are many excellent reasons why near patient testing is effective and worthwhile, those reasons only stand up where tests deliver the correct result. External Quality Assurance is one way of providing a high degree of comfort that such is the case.

UKNEQAS has yet to consider near patient testing and all the implications that widespread uptake would entail. The services presently offered are wide-ranging, and ***Bandolier*** this month publishes a full list of the schemes extant, their costs, and the names and contact numbers of their organisers on the Figure on page 8.

Laboratories performing any of these tests but not NEQAS members should rectify that.

Purchasers should ensure that laboratory services they buy are from laboratories which perform at least adequately in external quality assurance schemes.

UKNEQAS: TABLE OF ANNUAL CHARGES (UK CLINICAL LABORATORIES) FOR PARTICIPATION IN 1994-95

CLINICAL CHEMISTRY [a]

Clinical Chemistry	300
Lead & Cadmium in Blood	140
Specific Proteins	140
Glycated Haemoglobins	140
Salicylate & Paracetamol	140
Urinary Albumin	140
Urinary Catecholamines & Metabolites	140
Neonatal Screening (PKU, TSH)	140

DRUGS OF ABUSE [b]

Amphetamines, Barbiturates, Cannabinoids, Cocaine, Opiates, Opioids & Tranquillisers in urine	260
Ethanol in serum	150
(additional technique)	10

THERAPEUTIC DRUGS

Enrolment Fee	50
Antiepileptic Drugs	246
Respiratory Drugs	107
Methotrexate	58
Psycho-active Drugs	78
Cardiac Drugs	118

TRACE ELEMENTS [c]

Serum Copper, Zinc, & Gold
Serum Aluminium & Selenium
Urine Mercury & Cadmium
Water Aluminium

1 set	180
2 sets	240
3 sets	290
4 sets	300
5 sets	330
Water Al supplement:	10

HORMONES

PEPTIDE HORMONES [d]

FSH *and* LH	230
FSH *or* LH	each 150
Prolactin, Growth Hormone	each 150
All 4 analytes	*480*
PTH, ACTH, Calcitonin	each 150
All 3 analytes	*400*
AFP, hCG, CEA	each 150
All 3 analytes	*400*
NTD AFP	100
Downs Syndrome (AFP, hCG, E3)	200
NTD *and* Downs Syndrome	250

STEROID HORMONES [e]

Annual Enrolment Fee	50
Cortisol, 17aOH progesterone	each 180
Progesterone, Oestradiol	each 180
High-Level Oestradiol (IVF)	144
Male & Female Testosterone	each 108
Urinary Free Cortisol [f]	120
Sex Hormone Binding Globulin [g]	125

THYROID HORMONES [h]

T4, T3, free T4, free T3, TSH	320
Neonatal Screening (PKU, TSH)	140

HISTOPATHOLOGY

Immunocytochemistry [i]	255
Breast Cancer Screening [j]	Regions pay
Renal Pathology [k] - full participant	90
Renal Pathology - per colleague	30
Neuropathology [l]	free
Oral Pathology [m]	free

CLINICAL CYTOGENETICS [n]

Full Scheme	600
Diagnostic Bloods, Amniotic Fluids, Chorion Biopsies, Solid Tissues Haematological Samples	each 120

IMMUNOLOGY & IMMUNOCHEMISTRY [o]

AUTOIMMUNE SEROLOGY I

Rheumatoid Factor	90
Thyroid Antibodies	90
Antinuclear Antibody	90

AUTOIMMUNE SEROLOGY II

ENA Antibodies	60
Cardiolipin Antibodies	60
Neutrophil Cytoplasmic Antibody	90

AUTOIMMUNE SEROLOGY III

Acetylcholine Receptor Antibody	60

PROTEINS & ANTIGENS

CRP	110
b2 Microglobulin	110
AFP in amniotic fluid	110
Acetylcholinesterase in amniotic fluid	60
IgG Subclasses	110
PSA	110
Tumour Markers	110
Fungal & related Antigens	110
Monoclonal Protein identification	free

ALLERGY [p]

IgE (serum)	215
Allergen-specific IgE	325

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MICROBIOLOGY & VIROLOGY [q]

General Bacteriology	440
Mycology	115
Syphilis Serology	110
AAFB Microscopy	110
Rubella IgG Serology	115
Rubella IgM Serology	143
Hepatitis B Serology	143
HIV Serology	143
Virus Serology	143
Virus Isolation	154
Chlamydia Detection	143
Hepatitis C Serology	130
Toxoplasma Serology	130
Mycobacteria Culture	125

PARASITOLOGY [r]

Blood	155
Faecal	242

ANTIBIOTIC ASSAYS [s]

Gentamicin, Tobramycin, Netilmicin Amikacin, Vancomycin, Chloramphenicol, Flucytosine.	
1 antibiotic	133
2 or more antibiotics	143

BLOOD GROUP SEROLOGY [t]

ABO & Rhesus Grouping Antibody Screening & Identification Compatibility Testing	437

TISSUE-TYPING - HLA [u]

Scheme 1 - HLA Phenotyping	215
Scheme 1b - HLA B27 Typing	162
Scheme 2 - Cross-Matching	132
Scheme 3 - Antibody Identification	102

HAEMATOLOGY [v]

Blood Count	328
Blood & Parasite Films	52
Reticulocytes	52
Abnormal Hb/HbA2/HbF	52
Red Cells G-6-PD	52
Cytochemistry	52
Vitamin B12 Absorption Test	75
Red Cell Mass	75

LEUCOCYTE IMMUNOPHENOTYPING [w]

Immunofluorescence, -cytochemistry	270
Immune Monitoring	each

HAEMATINICS [x]

Vit B12, Folate, Ferritin, Red Cell Folate
* 1-2 anls £100, 3 anls £150, 4 anls £200

COAGULATION [y]

LEVEL 1	330
PT/INR	
PT Diagnostic (for anticoagulant control)	
APTT	
Thrombin Time	
Fibrinogen	
Fibrinogen Degradation Products	
Heparin Dosage	
LEVEL 2	273
Coagulation Inhibitors	
Factor VIII : C Assay	
von Willebrand Factor Antigen Assay	
von Willebrand Factor Activity Assay	
Factor IX : C Assay	
Factors II, V, VII, XI, & XII Assays	
Factor XIII Screen	
Antithrombin III Assays : Antigen & Activity	
Protein C Assays : Antigen & Activity	
Protein S Assays : Antigen & Activity	
Plasminogen	
Both Levels	603

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